

ABSTRACT

The present invention comprises a method for producing microfibers and nanofibers and further fabricating derived solid monolithic materials having aligned uniform micro- or nanofibrils. A method for producing fibers ranging in diameter from micrometer-sized to nanometer-sized comprises the steps of producing an electric field and preparing a solid precipitative reaction media wherein the media comprises at least one chemical reactive precursor and a solvent having low electrical conductivity and wherein a solid precipitation reaction process for nucleation and growth of a solid phase occurs within the media. Then, subjecting the media to the electric field to induce in-situ growth of microfibers or nanofibers during the reaction process within the media causing precipitative growth of solid phase particles wherein the reaction conditions and reaction kinetics control the size, morphology and composition of the fibers. The fibers can then be wet pressed while under electric field into a solid monolith slab, dried and consolidated.